Message

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Subject: News Update: Why Geographic Cancer Clusters are Impossible to Prove (Newsweek)

NEWS NCEA CAN USE

July 29, 2016

Why Geographic Cancer Clusters are Impossible to Prove

By Linda Marsa, Newsweek

Published July 18, 2016

Read the original article at: http://www.newsweek.com/2016/07/29/geographic-cancer-clusters-industrial-polluters-481423.html

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Some 15.5 million Americans alive today have beaten cancer; that number is projected to rise to more than 20 million by 2026. Those figures are a testament to the huge advances made in medicine. But breakthroughs in science are useless when patients are shunned by society and denied the care they need. This week, Newsweek *looks at how factors such as race or ethnicity, sexual orientation, gender, geography and income can determine whether a cancer patient lives or dies, in a special issue, "Curing Cancer."*

Danielle Bailey-Lash had agonizing headaches. The pain radiated from her neck to the top of her head and after weeks became so excruciating that she finally went to the emergency room. There, a scan revealed a tumor the size of a juice box on the right side of her brain. The then-35-year-old mother of two always prided herself on being healthy—she got plenty of exercise and never smoked or drank, so she was shocked to hear the diagnosis: Stage III astrocytoma, a rare and aggressive form of brain cancer. Doctors told her she had six months to live.

“I was devastated,” says Bailey-Lash, now 41. After surgery, radiation and chemotherapy, Bailey-Lash is now in remission, but the brush with death prompted her to question why she got sick—and why so many others who lived in her sleepy lakeside community in Belews Creek, North Carolina, in the foothills of the Blue Ridge Mountains, were stricken with cancer too.

The likely culprit seemed to be right in front of her: Just 100 yards from her house is a storage pond used by Duke Energy to collect waste from its coal-fired power plant 4 miles down the road. The man-made lake contains 4 billion gallons of coal ash slurry, a mixture of water and ash produced from burning coal.

According to an inventory Duke Energy filed with the Environmental Protection Agency (EPA) for 2010, the plant released more than 800,000 pounds of toxic pollutants into the air, as well as 32,000 pounds of arsenic, 7,333 pounds of chromium, 4,000 pounds of cobalt and other toxic heavy metals into the pond, all of which residents worry is seeping into the groundwater. This is especially significant in Belews Creek, where many locals rely on wells for their drinking water.

Jessica Gesell, left, was diagnosed with thyroid cancer at age 4 in 1984, and spent the next two years undergoing four courses of radiation and seven surgeries. She thinks she was exposed to radiation in utero, when her mother drank water contaminated by a nuclear meltdown in 1959 at the Santa Susana Field Laboratory in Los Angeles.

More than 1,700 people, around a quarter of whom are below the poverty line, live within a 3-mile radius of the Duke Energy power plant and coal ash pond. "If you drive down the road that leads to the plant," says local activist David Hairston, "in every single house, there's someone living with cancer or who has died of cancer." Yet in 2015, when the North Carolina Central Cancer Registry looked at cancer cases in counties with coal ash storage facilities, including Belews Creek, it didn't find the incidence of malignancies to be any higher there than in other parts of the state.

Critics say there was a key flaw in the registry's study: It looked at county-wide numbers, a data set large enough to subsume and hide the high number of cancer-stricken residents living right near the coal ash pond. This deficiency is representative of a larger problem that characterizes most attempts to uncover what's behind suspected but unconfirmed geographical cancer clusters: Often, researchers can't get the granular data they need for proof. "With environmental exposures, it's much more difficult to measure at the individual level," says Hal Morgenstern, a University of Michigan epidemiologist who studies cancer clusters. "Even with people living in the same neighborhoods, some may be exposed while others aren't."

So Duke Energy's plant keeps on chugging. "Despite extensive study by independent experts, there continues to be no evidence that the Belews Creek ash basin has impacted neighbors' well water or health," says Zenica Chatman, a spokeswoman for Duke Energy. "We operate under very strict state and federal permits that are designed to protect public health and the environment."

What happens in communities like Belews Creek exposes the racial and economic fault lines in America, where poor rural towns and communities of color often become the dumping ground for our nation's toxic waste. Residents of affected areas claim state regulators are slow to respond to their complaints—if they do anything at all—because their communities are poor and black. But even when the state health department dispatches a flotilla of epidemiologists to knock on doors, track down former residents, scour medical records and dutifully take samples of air, soil and water, they're usually stumped.

"Epidemiologists have this terrible batting average," says Dr. Raymond Neutra, former chief of the Division of Environmental and Occupational Disease Control with the California Department of Public Health. "The investigations of cluster towns have been very unproductive—yet this is the kind of study the public always wants us to do."

Clusters may be a statistical fluke, a run of bad luck like flipping a coin that comes up heads 10 times in a row. Sometimes, there are other confounding variables, such as higher concentrations of smokers or rates of obesity, which can up cancer rates in an area. Worse still, "the agencies that collect cancer data don't have the capacity to investigate whether people are exposed to a particular carcinogen," says Steven Wing, an epidemiologist at UNC–Chapel Hill who studies occupational and environmental health. "Consequently, you don't know who is actually drinking the contaminated water or breathing the bad air. So you're shooting in the dark."

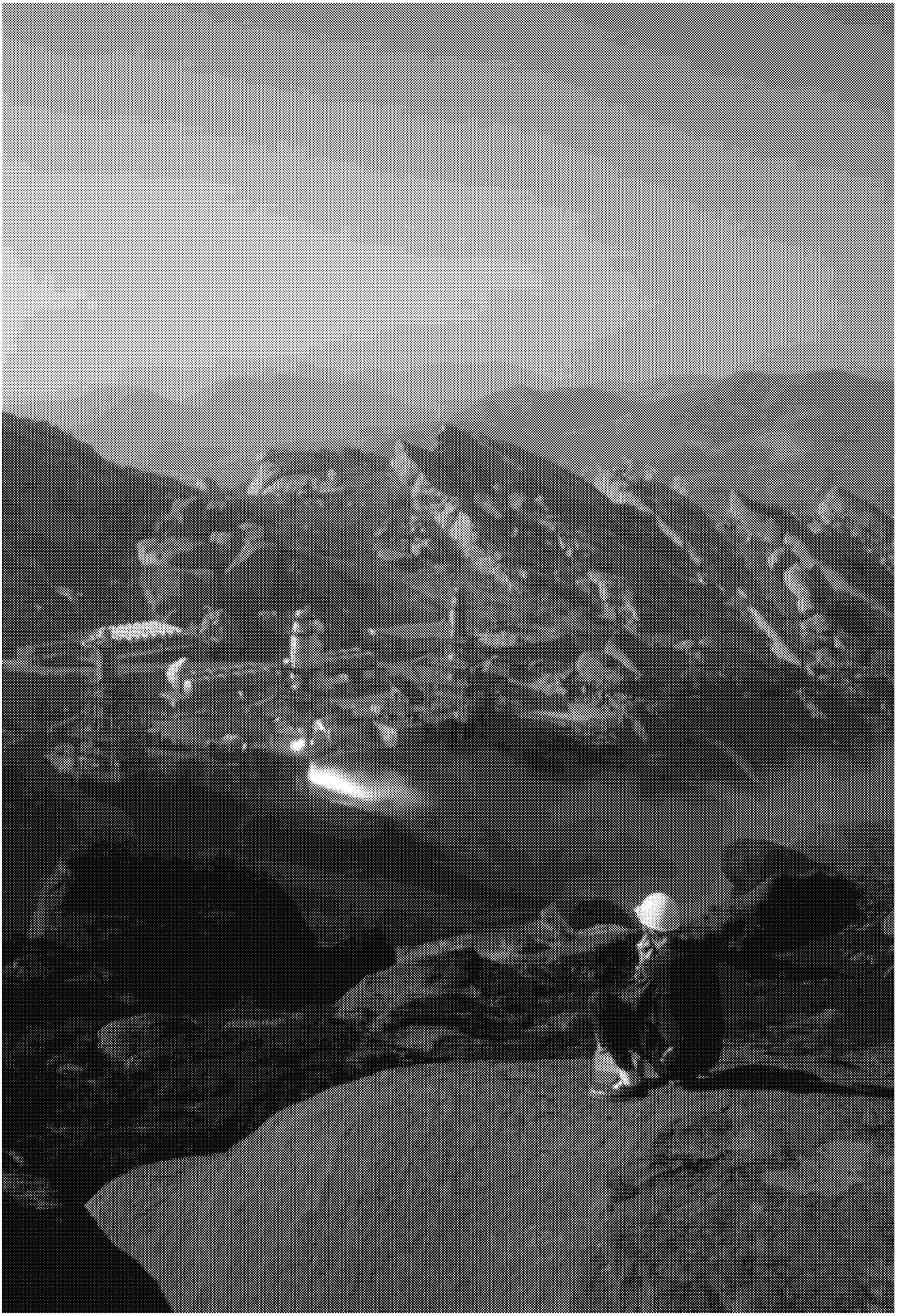
Laura Rainey, a project manager for the U.S. Energy Department area of the Santa Susana Field Laboratory, points to a map showing the contaminated areas highlighted in pink at the Santa Susana Field Laboratory on July 25, 2013, in Simi Valley, California.

The cause and effect with cancer clusters seem obvious. A plant opens, emitting noxious chemicals, and within the next several years, every other house nearby has someone who's stricken with cancer. Yet in case after case, cluster studies "rarely, if ever, produced an important finding," according to a 2012 review by Emory University researchers. In an exhaustive examination of 428 investigations in 38 states since 1990, they found an increased incidence of cancer at 72 of the sites, but at only three did they find "at least some evidence" of a link to the exposures, and only one investigation revealed a clear causal connection—a cluster of shipyard workers in the Charleston, South Carolina, area had developed lung cancer after long-term asbestos exposure.

"The smoking gun can be elusive, particularly when exposures may have happened 10 or 20 years before," says Thomas Burke, deputy assistant administrator in the EPA's Office of Research and Development and an expert in cancer cluster investigations. In some cases, cancers first appear decades after an exposure. In the meantime, individuals come in contact with all kinds of other chemicals in the workplace, in their homes, in the water and the air. Plus, people move away from the original sites, so it's hard to document their exposures, and it's almost impossible to know the precise magnitude of the incidence and whether the rates in the so-called cluster are unusual.

For an agent to cause cancer, exposure usually has to be at really high and repeated doses, like smoking a pack of cigarettes a day for 20 years, or daily contact with asbestos in a factory. That's why occupational clusters are simpler to prove: When workers breathe the fumes for years, it's easy to document the doses and identify the cause. With community cancer clusters, scientists are handicapped: They aren't able to measure in real time how much of these pollutants the community is inhaling—and which neighborhoods or even streets are most exposed. "If an agent doesn't leave a trace in the body or stick around in the environment," says Neutra, "we don't have the tools to detect them."

Even when the circumstantial case seems obvious, hard evidence can be elusive. In 1985, for instance, Marine Shale Processors began incinerating oil field waste, coal tar and creosote in a poor area of rural Louisiana. The plant operated round-the-clock, spewing clouds of heavy black smoke. Local residents complained of inhaling the noxious vapors from many miles away. Within 18 months, five children in nearby Morgan City, a town of about 12,000, were diagnosed with neuroblastoma, a rare childhood cancer. Not long after, similar cancer clusters were identified in Taylorville, Illinois, where exposures were linked to coal tar. Yet a 1989 study found no connection between the cancers and Marine Shale. The facility wasn't shuttered until 1996, after government regulators charged the company with numerous violations of federal laws because it improperly disposed of the hazardous wastes.



The partial nuclear meltdown at the Santa Susana Field Laboratory was one of the worst nuclear disasters in U.S. history.

"We linked these exposures at the Marine Shale to the facility in Illinois—it absolutely matched," says Wilma Subra, an environmental chemist in southern Louisiana who assisted the Morgan City residents. "But the missing piece was that we didn't have enough data to trace the chemicals that were being released to the actual exposures and how much is absorbed by the body. When you come in after the fact, the body has already excreted the chemicals, so there is no trace."

Public health officials are keenly aware of the inherent difficulties in studying cancer clusters. Scientists have devised more sensitive tools to measure exposure, and new computerized methods of reconstructing residential history and utilizing electronic data sources, along with advances in our understanding of the development of cancers—and the biological markers that indicate the presence of malignancies—should help improve detection.

Plus, the development of national cancer registries can now establish the baseline of cancer incidence so that deviations from the norms can be spotted more easily. In addition, a recently passed overhaul of the nation's primary chemical safety law, the Toxic Substances Control Act, should help. The bill, signed into law on June 22, gives the EPA the regulatory clout to stop potentially dangerous chemicals from entering the marketplace and to more swiftly remove those deemed toxic. Companies will no longer be able to hide behind "trade secret" claims to avoid identifying the chemicals they use, which should give the agency better tools to identify environmental causes of cancer. The law also specifically encourages federal agencies to investigate cancer clusters.

In the meantime, people all over the U.S. have to deal with the consequences of living in unconfirmed community clusters. Jessica Gesell, for example, believes she is a casualty of a nuclear accident near her home in Simi Valley, California, more than half a century ago. Diagnosed with thyroid cancer at age 4 in 1984, she spent the next two years undergoing four courses of radiation and seven surgeries. "One of the first questions my doctor asked my mother was, 'When was your child exposed to high levels of radiation?'" says Gesell. (Radiation exposure is a proven risk factor for thyroid cancer.)

Gesell thinks it happened in utero, when her mother drank water contaminated by a meltdown at the nearby Santa Susana Field Laboratory (SSFL) in a Los Angeles suburb. Founded in 1947 to test experimental nuclear reactors and rocket systems, the laboratory was operated by private aerospace companies, such as Rocketdyne, which later became Rockwell International. The companies conducted contract work for federal agencies, chiefly NASA. In 1989, the Department of Energy finally admitted there was a partial nuclear meltdown in 1959 that emptied more than 1 million gallons of trichloroethylene—an industrial solvent and suspected carcinogen—and significant quantities of radioactive iodine into the ground. Radioactive materials used at the site have half-lives of decades or more.

Gesell with her family today. Though she recovered from her initial bout of cancer, she was stricken with endometrial stromal sarcoma, a rare form of uterine cancer, in 2014.

The Boeing Company, which acquired 2,400 acres of the Santa Susana site in 1996, when it bought Rockwell International's aerospace division, has been involved in cleanup and remediation efforts with the aim of preserving the land as undeveloped open space. “To date, we have not found evidence of off-site contamination from SSFL that would pose a risk to human health or the environment,” says Megan Hilfer, a spokeswoman for Boeing. “Based on the findings of numerous independent health studies and the proactive measures we’ve taken to ensure continued community safety, there is no evidence that past facility operations have affected the health of the local community.”

But Gesell, who recovered from her initial bout of cancer only to be stricken in 2014 with endometrial stromal sarcoma, a rare form of uterine cancer, is unconvinced. A 2007 study by University of Michigan researchers seemed to back Gesell up, showing those living within 2 miles of the Field Laboratory were 60 percent more likely to be stricken with cancers of the thyroid, upper digestive tract, bladder, blood and lymph tissue than those who lived more than 5 miles away. But even so, Morgenstern, the University of Michigan epidemiologist who led these studies, isn't sure proximity to the laboratory is to blame. "Not everyone is exposed in the same way, and we can't measure an individual's exposures," he says. "It's extremely hard to tease out all the variables."

Gesell believes she has all the proof she needs. "The scars on my body from countless surgeries could have all been avoided had measures been taken to keep people in our city safe," she says. "But there has never been any cleanup—just a cover-up."

Ashley Mayrianne Jones
Science Communications Associate (Student Contractor)
National Center for Environmental Assessment
Office of Research and Development, U.S. EPA
Jones.Ashley@epa.gov
703-347-0523